

Notice of Allowability

Application No.

09/944,782

Examiner

Salman Ahmed

Applicant(s)

SHARMA ET AL.

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendments filed on 4/5/2006.
2. ☒ The allowed claim(s) is/are 1,3-16,18-32,34-44,46-50 and 52-56.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input checked="" type="checkbox"/> Other _____. |

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Lester Vincent on 5/23/2006 at about 1:00 p.m. EST. The application has been amended as follows:

The claims have been amended as per the attachment titled "Appendix".

Allowable Subject Matter

2. Claims 1, 3-16, 18-32, 34-44, 46-50 and 52-56 are allowed.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Salman Ahmed whose telephone number is (571)272-8307. The examiner can normally be reached on 8:30 am - 5:00 pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit 2616

SA
06/13/2006



HASSAN KIZOU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

APPENDIX

CLAIMS

For the Examiner's convenience, a list of all claims is included below.

1. (Currently Amended) A method, comprising:

establishing a distribution pattern to distribute multilink frame relay (MFR) fragments, the distribution pattern including a sequence of link entries associated with links in a link bundle, wherein each link entry is identified when the associated link is ~~capable of transmitting~~ configured to transmit a fragment in a fastest transmit time, wherein the fastest transmit time is determined based on the link speed of the link and a transmit time for the link to transmit other fragments previously allocated to that link, wherein the number of link entries in the distribution pattern is determined by dividing a total link speed of the link bundle by a minimum non-zero link speed supported by a system; and

distributing the fragments according to the distribution pattern from a first link entry to a last link entry in the distribution pattern, wherein the distribution pattern is repeated after the last link entry.

2. (Canceled)

3. (Original) The method of claim 1, wherein the fastest transmit time is further determined based on a fragment size.

4. (Original) The method of claim 3, wherein when more than one link is capable of transmitting a fragment in a fastest transmit time, the link entry is identified based on an associated link having a fastest link speed.

5. (Original) The method of claim 1, wherein the transmit time for the link to transmit other fragments previously allocated to that link is accumulative until the last link entry in the distribution pattern is determined.

6. (Original) The method of claim 1, wherein distributing the fragments according to the distribution pattern comprises:

selecting a link entry from the distribution pattern in the sequence from the

first link entry to the last link entry;

determining if a link associated with the selected link entry has available credit;

when the link has available credit, distributing the fragment to the link and reducing the credit available to that link; and

when the link does not have available credit, selecting a next link entry in the sequence.

7. (Original) The method of claim 6, wherein the credit is allocated to each link based on the link speed and a periodic interval gap.

8. (Original) The method of claim 6, wherein the distribution pattern is repeated at the first link entry and before selecting the last link entry, after expiration of a predetermined waiting time period to receive a fragment to be distributed to a link in the link bundle.

9. (Original) The method of claim 1, wherein the distribution pattern is implemented as an array data structure.

10. (Currently amended) A method, comprising:

determining a number of positions in a distribution pattern to distribute multilink frame relay (MFR) fragments, the distribution pattern including a sequence of link entries associated with links in a link bundle;

identifying a link entry for a first position in the distribution pattern, comprising:

selecting a link in the link bundle that is ~~capable of transmitting~~ configured to transmit a first fragment in a fastest time based on the link speed of each link, a total transmit time associated with each link, and a fragment size;

placing a link entry associated with the selected link in the first position in the distribution pattern;

adding the fastest transmit time to the total transmit time associated with the selected link; and

repeating said identifying for a link entry for a next position in the distribution pattern to transmit a next fragment until a link entry is selected for all positions in the distribution pattern.

11. (Original) The method of claim 10, wherein the number of positions in the distribution pattern is based on a total link speed of links in a link bundle and a minimum possible link speed of a link supported by a system.

12. (Original) The method of claim 10, wherein when there is more than one link having the same fastest transmit time, a link associated with a fastest link speed is selected.

13. (Original) The method of claim 10, further comprising distributing fragments according to the distribution pattern from the link entry in the first position to a link entry in a last position in the distribution pattern, wherein the distribution pattern is repeated after the link entry in the last position.

14. (Original) The method of claim 13, wherein distributing the fragments according to the distribution pattern comprises:

- selecting a link entry from the distribution pattern in a sequence from the first position to the last position;

- determining if a link associated with the selected link entry has available credit;

- when the link has available credit, distributing a current fragment to the link and reducing the available credit for that link; and

- when the link does not have available credit, selecting a next link entry in the sequence.

15. (Original) The method of claim 14, wherein the credit is allocated to each link based on the link speed and a periodic interval gap.

16. (Currently Amended) A computer readable medium having stored thereon sequences of instructions which are executable by a system, and which, when executed by the system, cause the system to:

establish a distribution pattern to distribute multilink frame relay (MFR) fragments, the distribution pattern including a sequence of link entries associated with links in a link bundle, wherein each link entry is placed in the distribution pattern when the link is ~~capable of~~ transmitting configured to transmit a fragment in a fastest transmit time, the fastest transmit time determined based on the link speed of the link and a transmit time for the link to transmit other fragments previously allocated to the link, wherein the number of link entries in the distribution pattern is determined by dividing a total link speed of the link bundle by a minimum possible non-zero link speed supported by a system; and

distribute the fragments according to the distribution pattern from a first link entry to a last link entry in the distribution pattern, wherein the distribution pattern is repeated after the last link entry.

17. (Canceled)

18. (Original) The computer readable medium of claim 16, wherein the fastest transmit time is further determined based on a fragment size.

19. (Original) The computer readable medium of claim 16, wherein when more than one link is capable of transmitting a fragment in a fastest transmit time, the link entry is determined based on an associated link having a fastest link speed.

20. (Original) The computer readable medium of claim 16, wherein the transmit time for the link to transmit other fragments previously allocated to that link is accumulative until the last link entry in the distribution pattern is determined.

21. (Original) The computer readable medium of claim 16, wherein the instructions to distribute the fragments according to the distribution pattern comprises instructions to:

select a link entry from the distribution pattern in the sequence from the first link entry to the last link entry;

determine if a link associated with the selected link entry has available credit;

when the link has available credit, distribute the fragment to the link and reduce the credit available to that link; and

when the link does not have available credit, select a next link entry in the sequence.

22. (Original) The computer readable medium of claim 21, wherein the credit is allocated to each link based on the link speed and the periodic interval gap.

23. (Original) The computer readable medium of claim 16, wherein the distribution pattern is repeated at the first link entry and before selecting the last link entry after expiration of a predetermined waiting time period to receive a fragment to be distributed to a link in the link bundle.

24. (Original) The computer readable medium of claim 16, wherein the distribution pattern is implemented as an array data structure.

25. (Currently Amended) A computer readable medium having stored thereon sequences of instructions which are executable by a system, and which, when executed by the system, cause the system to:

determine a number of positions in a distribution pattern;

identify a link entry for a first position in the distribution pattern, comprising instructions to:

select a link in the link bundle that is ~~capable of transmitting~~ configured to transmit a first fragment in a fastest time based on the link speed of each link, a total transmit time associated with each link, and a fragment size;

place a link entry associated with the selected link in the first position in the distribution pattern; and

add the fastest transmit time to the total transmit time associated with the selected link; and

repeat said instructions to identify for a link entry for a next position in the distribution pattern to transmit a next fragment until a link entry is selected for all positions in the distribution pattern.

26. (Original) The computer readable medium of claim 25, wherein the number of positions in the distribution pattern is based on a total link speed of links in a link bundle and a minimum possible link speed supported by a system.

27. (Original) The computer readable medium of claim 25, wherein when there is more than one link having the same fastest transmit time, a link associated with a fastest link speed is selected.

28. (Original) The computer readable medium of claim 25, further comprising instructions to distribute fragments according to the distribution pattern from the link entry in the first position to a link entry in a last position in the distribution pattern, wherein the distribution pattern is repeated after the link entry in the last position.

29. (Original) The computer readable medium of claim 28, wherein the instructions to distribute the fragments according to the distribution pattern comprises instructions to:

select a link entry from the distribution pattern in a sequence from the first position to the last position;

determine if a link associated with the selected link entry has available credit;

when the link has available credit, distribute a current fragment to the link and reduce the credit available to that link; and

when the link does not have available credit, select a next link entry in the sequence.

30. (Original) The computer readable medium of claim 29, wherein the credit is allocated to each link based on the link speed.

31. (Currently Amended) A system, comprising:

a memory;

a processor configured to establish a distribution pattern to distribute multilink frame relay (MFR) fragments, the distribution pattern including a sequence of link entries associated with links in a link bundle, wherein each link entry is placed in the distribution pattern when the link is ~~capable of transmitting~~ configured to transmit a current fragment in a fastest transmit time,

wherein the fastest transmit time is determined based on the link speed of the link and a transmit time for the link to transmit other fragments previously allocated to the link, wherein a number of link entries in the distribution pattern is determined by dividing a total link speed of the link bundle by a minimum possible non-zero link speed supported by the system.

32. (Original) The system of claim 31, wherein the processor is further configured to distribute the fragments according to the distribution pattern from a first link entry to a last link entry in the distribution pattern, wherein the distribution pattern is repeated after the last link entry.

33. (Canceled)

34. (Original) The system of claim 31, wherein the fastest transmit time is further determined based on a fragment size.

35. (Original) The system of claim 34, wherein when more than one link is capable of transmitting a current fragment in the fastest transmit time, a link entry associated with a link having a fastest link speed is placed in the distribution pattern.

36. (Original) The system of claim 31, wherein the transmit time for the link to transmit other fragments previously allocated to that link is accumulative until the last link entry in the distribution pattern is determined.

37. (Original) The system of claim 32, wherein, to distribute the fragments according to the distribution pattern, the processor is configured to:

- select a link entry from the distribution pattern in the sequence from the first link entry to the last link entry;

- determine if a link associated with the selected link entry has available credit;

- when the link has available credit, distribute the fragment to the link and reduce the credit available to that link; and

- when the link does not have available credit, select a next link entry in the sequence.

38. (Original) The system of claim 37, wherein the credit is allocated to each link based on the link speed and a periodic interval gap.

39. (Original) The system of claim 31, wherein the distribution pattern is repeated at the first link entry and before selecting the last link entry after expiration of a predetermined waiting time period to receive a fragment to be distributed to a link in the link bundle.

40. (Original) The system of claim 31, wherein the distribution pattern is implemented as an array data structure.

41. (Currently Amended) A system, comprising:

means for establishing a distribution pattern to distribute multilink frame relay (MFR) fragments, the distribution pattern including a sequence of link entries associated with links in a link bundle, wherein a number of link entries in the distribution pattern is determined by dividing a total link speed of the link bundle by a minimum ~~possible~~ non-zero link speed supported by the system; and

means for distributing the fragments according to the distribution pattern from a first link entry to a last link entry in the distribution pattern, wherein the distribution pattern is repeated after the last link entry.

42. (Original) The system of claim 41, wherein the means for distributing the fragments according to the distribution pattern comprises means for selecting a link entry from the distribution pattern based on available credit.

43. (Original) The system of claim 41, wherein the means for distributing the fragments according to the distribution pattern comprises means detecting expiration of a predetermined waiting period and means for resetting to the first entry in the distribution pattern.

44. (Currently Amended) A method, comprising:

establishing a distribution pattern to distribute multilink frame relay (MFR) fragments, the distribution pattern including a sequence of link entries associated with links in a link bundle, wherein a number of link entries in the distribution pattern is determined by dividing a total link

speed of the link bundle by a minimum possible non-zero link speed supported by the system;
and

distributing the fragments according to the distribution pattern from a first link entry to a last link entry in the distribution pattern, wherein the distribution pattern is repeated after the last link entry.

45. (Canceled)

46. (Original) The method of claim 44, wherein each link entry in the distribution pattern is determined based on the associated link being able to transmit a fragment in a fastest transmit time, the fastest transmit time determined based on the link speed of the link, a fragment size, and a transmit time for the link to transmit other fragments previously allocated to that link.

47. (Original) The method of claim 46, wherein when more than one link is capable of transmitting a fragment in the fastest transmit time, the link entry is determined based on an associated link having a fastest link speed.

48. (Original) The method of claim 44, wherein the transmit time for the link to transmit other fragments previously allocated to that link is accumulative until the last link entry in the distribution pattern is determined.

49. (Original) The method of claim 44, wherein the fragments are further distributed based on available credit.

50. (Currently Amended) An apparatus, comprising:

a link bundle including two or more links, the link bundle configured to transmit multilink frame relay (MFR) fragments from a first data processing engine to a second data processing engine according to a distribution pattern, wherein the distribution pattern comprises link entries associated with each of the two or more links in the link bundle, wherein a number of entries in the distribution pattern is determined by dividing a total speed of the links in the link bundle by a minimum possible non-zero link speed supported by a system.[[.]]

51. (Canceled)

52. (Original) The apparatus of claim 50, wherein the distribution pattern is repeated after a last link entry.

53. (Original) The apparatus of claim 50, wherein each link entry in the distribution pattern is identified based on a link speed of a link and a transmit time for the link to transmit other fragments previously allocated to that link.

54. (Currently Amended) An apparatus, comprising:

means for transmitting multilink frame relay (MFR) fragments from a first data processing engine to a second data processing engine according to a distribution pattern, wherein the distribution pattern comprises link entries associated with links in a link bundle, ~~wherein;~~ and means for determining a number of entries in the distribution pattern ~~is determined~~ by dividing a total speed of the links in the link bundle by a minimum ~~possible~~ non-zero link speed supported by a system. [[.]]

55. (Original) The apparatus of claim 54, further comprising means for determining a number of entries in the distribution pattern.

56. (Original) The apparatus of claim 54, further comprising means for identifying each link entry in the distribution pattern.